

INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1996	Park: Shenandoah NP						
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Name: Dr. Jeff Raffensberger	Phone: n/a	Email: n/a					
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Permit#: SHEN1996ARVU							
Park-assigned Study Id. #: unknown							
Project Title: Mechanisms Of Groundwater Transport In A Stream-Saprolite System With Transient Storage Capabilities (N-191)							
Permit Start Date: Jan 01, 1998	Permit Expiration Date Jan 01, 1998						
Study Start Date: Jan 01, 1995	Study End Date Jan 01, 1998						
Study Status: Completed							
Activity Type: Research							
Subject/Discipline: Water / Hydrology							
Objectives: <p>This project is an investigation of stormflow and water transport in a small upland drainage basin whose geological attributes are common throughout the Piedmont region of the eastern US. We seek to quantify the degree to which groundwater, precipitation, and soil water contribute to the overall stream hydrograph and chemograph during precipitation and runoff events, as well as explain the physical mechanisms by which the transport of water occurs.</p>							
Findings and Status: <p>As of the present time, most of the required field work has been completed; the remaining field work involves the continuous monitoring of stream stage and precipitation amounts, measurement of water table fluctuations, and the periodic collection of small water samples from the stream. In the past year sequential stream samples have been collected during several precipitation events. Analysis of the oxygen-18 content of the water suggests that pre-event water (i.e., base flow) constitutes 80 to 90 percent of stormflow, with the remainder being event water (i.e., precipitation.) Samples collected from nine tension lysimeters indicates that soil water has an oxygen-18 content similar to base flow. Groundwater from a deep well in the study area has an isotopic composition significantly different from that of base flow, suggesting that the streamflow is principally sustained by shallower groundwater at low flow. Silica appears to act as a conservative tracer in this setting, provided antecedent conditions are not unusually dry. Confirmation of this assertion is expected soon by means of analysis of the chloride ion concentrations in the samples. Water table responses show that the areal extent of near-surface saturated stormflow ranges from less than 5 meters near the outlet of the catchment to more than 30 meters in the upper reaches of the catchment. A series of experiments to establish a rating curve relating stream stage to stream discharge has been carried out, but rearrangement of the stream channel by flood events (such as Hurricane Fran) has required recalculation of the rating curve function.</p>							
For this study, were one or more specimens collected and removed from the park but not destroyed during analyses? No							
Funding provided this reporting year by NPS:	Funding provided this reporting year by other sources:						

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Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university: n/a	Annual funding provided by NPS to university or college this reporting year: 0